

LEUKEMIA MORTALITY RISK FROM IONIZING RADIATION IN THE COHORT OF WISMUT URANIUM MINERS 1946–2003

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Background and Aims: The dependence of the risk for leukemia mortality on ionizing radiation in the low dose range is of much interest in radiation protection. Data from the German Wismut uranium miner cohort study are analyzed here to further evaluate this topic.

Methods: The cohort includes about 59 000 men contributing 128 leukemia deaths and approximately 2 million person years during the time-span from 1946–2003 (uranium mining was done until 1989). The excess relative risk (ERR) and 95% confidence limits (CI) for leukemia in relation to absorbed red bone marrow (RBM) dose has been assessed using Poisson regression stratified by age and calendar year. Both linear and categorical models have been used. The average absorbed RBM dose was 48.8 mGy (range 0 to 989 mGy) to which external gamma radiation contributed on the mean 40.9 mGy (range 0 to 909 mGy).

Results: The linear trend in leukemia excess relative risk per unit absorbed RBM dose was $\text{ERR/Gy} = 1.39$ (95%CI -1.18 to 3.97 , $p = 0.29$) assuming a lag-time of 2 years. The chronic lymphatic leukemia (CLL) and non-CLL sub-type linear risk estimates are 0.33 (95%CI: -3.44 to 4.11) and 2.08 (95%CI: -1.39 to 5.55), respectively.

Conclusions: The results do not show a statistically significant increase in risk of death from leukemia, but risk coefficients are consistent with published estimates. The present study is limited by low numbers of leukemia cases, a low dose range and lack of data on leukemia incidence. Presently information on medical radiation exposure is gathered in an ongoing nested case control study on leukemia based on an extended follow-up period.